KENYA TOP TEN FACTS ABOUT
AGRI-BIOTECH & BIOSAFETY

FACT 1

Kenya was the first Country to Sign the Cartagena Protocol on Biosafety

Former President Daniel Arap Moi signing the Cartagena Protocol

1. The former President Daniel Arap Moi signed the international treaty governing the movement of living modified organisms resulting from modern biotechnology from one country to the other during the 5th Conference of Parties in May 2000 at UNEP headquarters, Nairobi. The country ratified the Protocol in 2003.

2. The Protocol's objective is to contribute to ensuring an adequate level of protection in safe transfer, handling and use of living modified organisms resulting from modern biotechnology that may have adverse effects on the conservation and sustainable use of biological diversity, taking into account risks to human health and specifically focusing on trans boundary movements.

3. The Cartagena Protocol in Biosafety to the Convention on Biological Diversity laid down the necessary platform for implementation of National Biosafety Frameworks and establishment of effective biosafety management systems.

You can download the Protocol from:

https://www.cbd.int/doc/legal/cartagena-protocol-en.pdf

Kenya Approved a National Policy on Biotechnology Development in 2006

FACT 2

1. The Kenya government's vision and commitment towards promotion and application of biotechnology is articulated in the National Biotechnology Development Policy that was endorsed by Cabinet in 2006.
2. This policy outlines the government's commitment to safe development and deployment of biotechnology for socio-economic development.
3. The policy charts a vision towards the development and safe application of biotechnology, to guide research and commercialization of modern biotechnology products in the country.

You can download the policy from:

http://en.biosafetyscanner.org/pdf/doc/350_allegato.pdf

Former president Mwai Kibaki opening a state of the art GM research lab in the country

FACT 3

Kenya Enacted its Biosafety Act in 2009

Former Minister for Higher Education, Science and Technology Hon. Prof. Margret Kamar (left) launching the NBA five-year strategic plan

1. The Kenya Biosafety Bill was drafted in 2005. After several years of stakeholder consultations and parliamentary debates, the Bill was eventually passed by Parliament in 2008, and enacted into law on 12th February 2009 as Biosafety Act No. 2 of 2009.

2. The Act's primary goal is to ensure that Kenya maximizes the benefits of modern biotechnology while safeguarding against any potential risks to human health and adverse effects to the environment.

3. The Act lays down legal and institutional frameworks for governing modern biotechnology in the country. So far, Kenya is the only African country to have used its own domesticated biosafety law to grant decisions on applications for open field cultivation of GM crops.

You can download the act from:

http://africenter.isaaa.org/wp-content/uploads/2015/07/Biosafety-Act-No.2-of-2009.pdf

The National Biosafety Authority was Officially Launched in May 2010

FACT 4

1. The National Biosafety Authority (NBA) was established through a provision of the Biosafety Act 2009, as the competent authority to provide overall supervision and monitoring of GMO research and commercialization activities.

2. To achieve its mandate, the authority works closely with eight regulatory agencies:
   I. Kenya Plant Health Inspectorate Service
   II. Directorate of Veterinary Services
   III. Department of Public Health
   IV. Kenya Bureau of Standards
   V. National Environment Management Authority
   VI. Kenya Wildlife Services
   VII. Kenya Industrial Property Institute
   VIII. Pest Control Products Board

3. As of June 2018, the authority had handled a total of 74 applications in four categories of GMO activities.

GMO applications handled by NBA as of August 2017

	Approved	Pending	Total
Lab/Greenhouse Trials	**29**	**0**	**29**
Confined Field Trials	**14**	**0**	**14**
Environmental Release	**2**	**1**	**3**
Imports and Transit of GM Products	**28**	**0**	**28**
Total			**74**

FACT 5

The National Biosafety Authority has Published Four Sets of Biosafety Regulations

Former Education Cabinet Secretary Dr. Fred Matiang'i and the Former chair NBA board Dr. Mary Amuyunzu-Nyamongo launching the labeling regulation for GM products

1. The four regulations as stipulated in the Kenya Legislative Supplements of the Biosafety Act, 2009 are:
   I. The Environmental Release Regulations (2011)
   II. The Import, Export and Transit Regulations (2011)
   III. The Contained Use Regulations (2011)
   IV. The Labeling Regulations (2012)
2. The four regulations ensure:
   I. Potential adverse effects to human health and environment are addressed upon open cultivation of GM crops.
   II. There is safe movement of genetically modified materials in and out of the country.
   III. Research on genetic modification is done under containment.
   IV. There is efficient tracking of GM products in the food supply chain and information availed to the consumer.
3. Today, the first three regulations of the year 2011 are operational, the labeling regulation of the year 2012 will come into place upon commercialization of GM crops in the country.

Kenya is one of the Ten African Countries that Continued to Conduct Field Trials on Biotech Crops in 2016

FACT 6

1. Kenya is steadily gearing towards commercialization of GM crops. As of 2017, the country had undertaken confined field trials (CFTs) on various crops; insect resistant cotton, drought tolerant maize, insect resistant maize, virus resistant cassava, virus resistant sweet potato, bacterial wilt resistant banana and biofortified sorghum.

2. Most of the trials are on important food security crops focusing on traits of high relevance to challenges facing the country. The trials are conducted collaboratively with the premier Kenya Agricultural and Livestock Research Organization (KALRO).

3. The National Biosafety Authority has given conditional approvals for environmental release to Bt-WEMA maize and Bt cotton. Plans to conduct National Performance Trials for both crops are underway.

KALRO Director General Dr. Eliud Kireger (second right) during a field visit to a GM cassava experimentation site

Status of Confined Field Trials in Kenya in 2017

Crop	Trait	Institutions Involved	Confined Field Trial Stage as of June 2018
Maize, *Zea mays* L.	Drought tolerance (WEMA)	AATF, CIMMYT, KALRO	CFT – 6th Season completed
	WEMA Insect resistance (Bt maize-MON810)	AATF, CIMMYT, KALRO	Conditional Approval for Environmental release; awaiting National Performance Trials (NPTs)
	Stack maize event for Bt (MON 810) and Drought (MON 87460)	AATF, CIMMYT, KALRO	1st season CFT completed
Cotton, *Gossypium hirsutum* L.	Insect resistance	KALRO, Monsanto	Approved for Environmental release; National Performance Trials (NPTs) ongoing
Gypsophila, *Gypsophila paniculata*	Pink Coloration of Petals	Danziger – "Dan" Flower Farm, Israel	Review for Environmental release
Cassava, *Manihot esculenta Crantz*	Cassava Brown Streak Disease Introgression into CMD tolerant background materials	KALRO, Danforth Plant Science Center (DDPSC)	1st season CFT completed, Regulatory trial ongoing - 1st season
	Cassava Brown streak virus (CBSV) and African Cassava Mosaic Virus (ACMV)	Masinde Muliro University of Science and Technology (MMUST)	CFT - 1st season completed
Sweet potato, *Ipomoea batatas*	siRNA resistance to Sweet potato virus disease	KALRO-Kakamega, Danforth Plant Science Center (DDPSC)	1st season CFT completed
Banana	Banana bacterial – *Xanthomonas* Wilt (BXW) resistance	KALRO, IITA	1st season CFT completed
Sorghum (ABS), *Sorghum bicolor* Moench	Enhanced pro-Vit. A levels, Bio-available Zinc and Iron	Africa Harvest, Pioneer Hi-Bred, a DuPont business and KALRO	CFT – 7th Season completed

Acronyms

- AATF - African Agricultural Technology Foundation
- DDPSC - Donald Danforth Plant Science Center
- CIMMYT - International Maize and Wheat Improvement Center
- IITA - International Institute of Tropical Agriculture
- KALRO - Kenya Agricultural and Livestock Research Organization
- MMUST - Masinde Muliro University of Science and Technology
- WEMA - Water Efficient Maize for Africa

By June 2018, three applications for open field cultivation of GM maize, cotton and Gypsophila flower had been processed

FACT 7

1. In February 2016, NBA granted conditional approval for open cultivation of Bt-WEMA maize. In Kenya, stem borers reduce maize production by 13% or 400,000 tonnes, equivalent to the normal yearly amount of maize the country imports.

2. In June 2018, NEMA granted approval for National Peformance Trials (NPTs) for Bt cotton. Currently, only 5 out of a total 22 ginneries are operational, producing an average of 25,000 bales against a yearly demand of 200,000 bales with the deficit covered through imports.

3. An application for open cultivation of GM Gypsophila, an ornamental flower grown for export which was submitted by Israeli company Imaginature Ltd. is under review.

National performance Trials for Bt cotton planting exercise

FACT 8

Kenya has the Scientific Infrastructure and Human Capacity Needed to Develop GM Crops

A scientist working in a GM research lab at BecA, ILRI

1. Kenya has the infrastructure and capacity needed for research and regulation of biotech crops. Currently, there are over 100 scientists engaged in research and development (R&D) activities countrywide, with 45% of these scientists working in the public sector. Biosafety facilities for modern biotechnology include a Level II Greenhouse at the Kenya Agricultural and Livestock Research Organization (KALRO) and the Plant Transformation Laboratory at Kenyatta University.

2. National universities have established strong research programs for training young scientists on modern biotechnology. They include, among others:
   I. Kenyatta University
   II. Jomo Kenyatta University of Agriculture and Technology
   III. Masinde Muliro University of Science and Technology
   IV. University of Nairobi
   V. Egerton University
   VI. University of Eldoret

3. The country hosts various international research organizations under the CGIAR group working on GM research and is home to the Biosciences eastern and central Africa (BecA) regional hub, a world-class research facility nestled at the International Livestock Research Institute (ILRI).

Kenya has a well-structured Mechanism for Creating Awareness on Biotech Crops

FACT 9

1. In September 2008, the government launched a National Biotechnology Awareness Strategy (BioAWARE), a platform aimed at improving public understanding and awareness on biotechnology.
2. The International Service for the Acquisition of Agri-biotech Applications (ISAAA) AfriCenter pioneered awareness creation activities in the early nineties. Over the last decade, together with the African Agriculture Technology Foundation through OFAB, the AfriCenter continues to be at the forefront in raising awareness on agricultural biotechnology.
3. Other organizations involved in awareness creation initiatives include the African Biotechnology and Stakeholders Forum (ABSF), Africa Harvest, various universities under the Kenya University Biotechnology Consortium (KUBICO), as well as the private sector, mass media and several civil society groups.

H.E. William Ruto, the Deputy President Launching the BioAWARE Strategy in 2008

FACT 10

Kenya needs to Position Herself to Benefit from New and Emerging Technologies in Agriculture

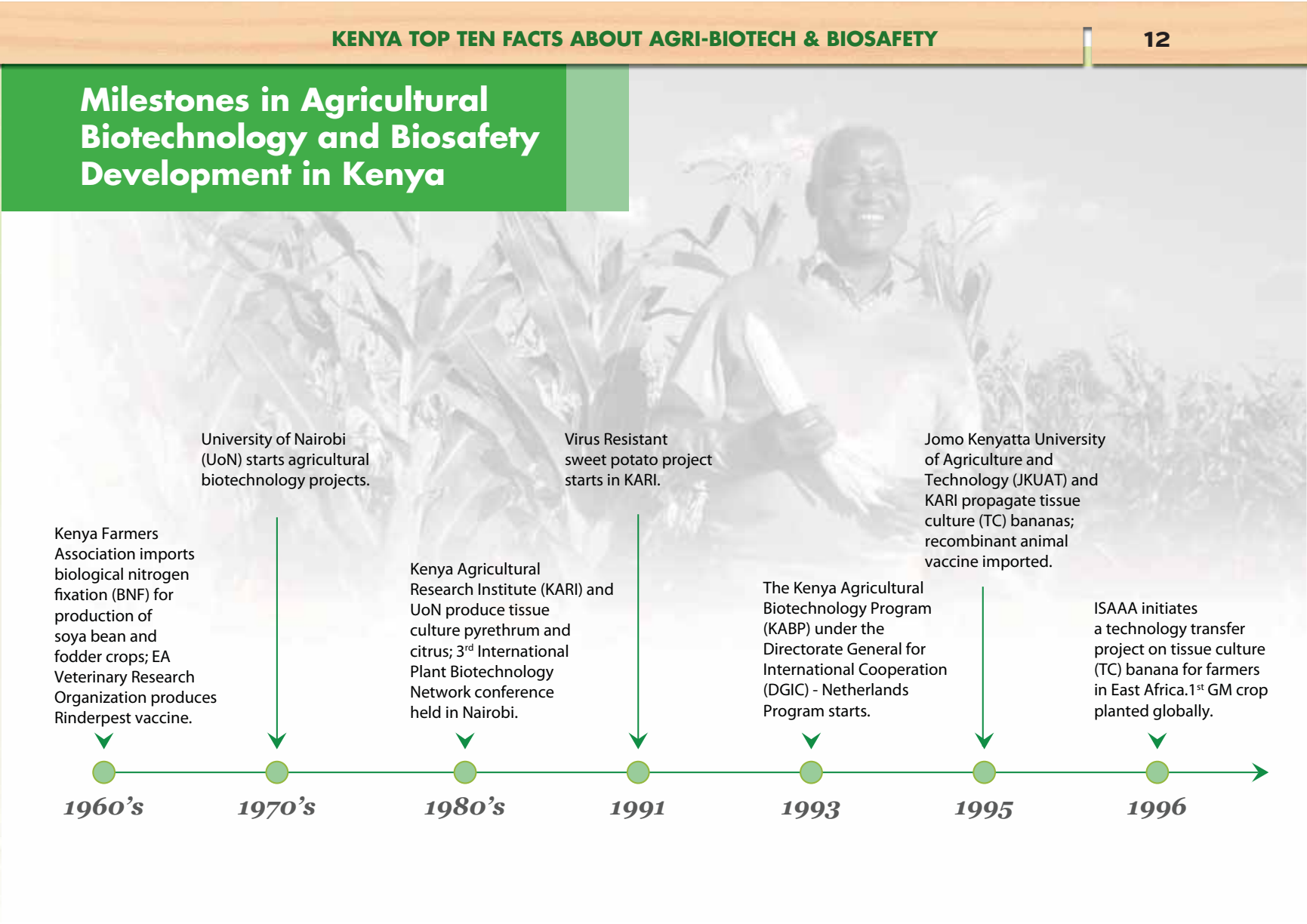
Sundan farmers in a Bt cotton field

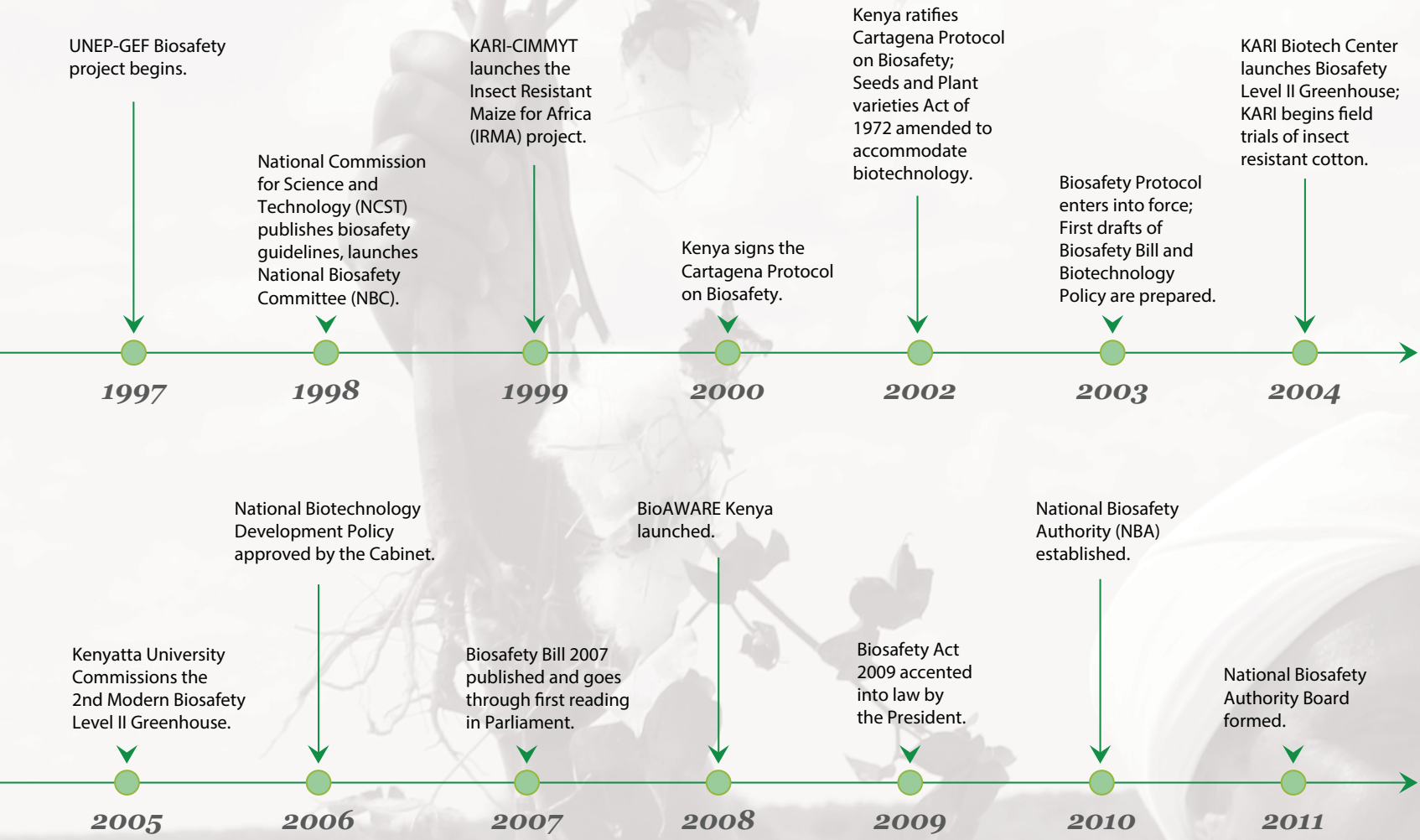
1. The global increase in income benefits for farmers growing biotech cotton between the year 1996 and 2016 was US$59.9 billion. Only two African countries (South Africa and Sudan) were able to share in these benefits. During the same period, the global increased revenues achieved from planting biotech maize was US$63.7 billion. Again, only South Africa benefited from these revenues at the time when over 300 million Africans who depend on maize as a staple were denied the choice to adopt biotech crops.

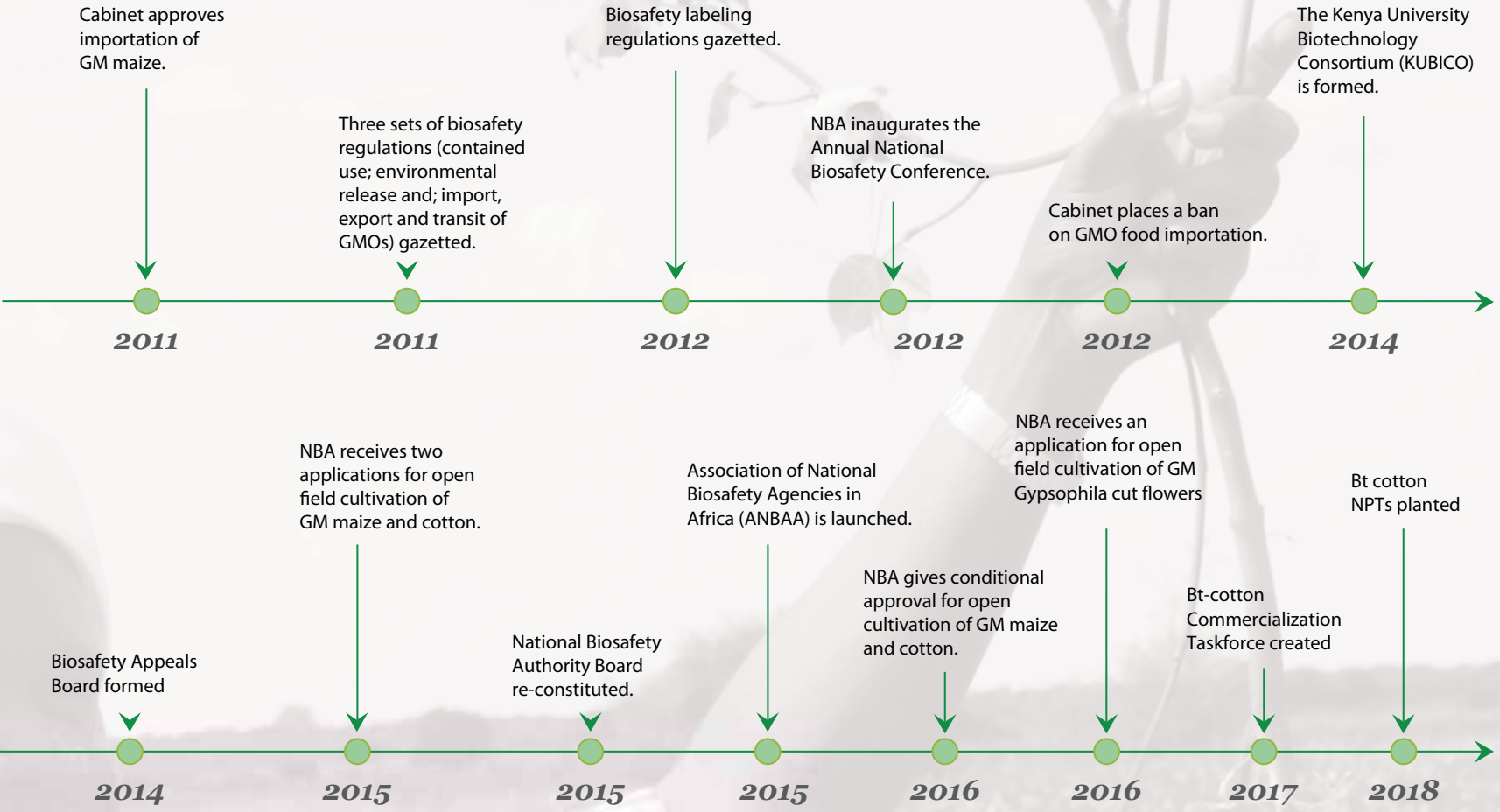
2. The 1st and the 2nd generation of biotech crops mainly focused on single and stack traits for herbicide tolerance, disease/insect resistance and reduced production costs. Today, the world has moved on to new crop breeding tools like genome editing with the 3rd generation focusing on developing output traits for improved nutritional quality and composition, increased yield as well as reduced post-harvest damage. Biotech soybean improved through genome editing for delayed flowering resulting in increased vegetative size is such an example.

3. With robust regulatory frameworks on biotechnology and biosafety already in place, Kenya should align herself to tap into the benefits arising from incorporating these new agri-biotech tools into the agricultural system for sustainable food production and wealth creation.

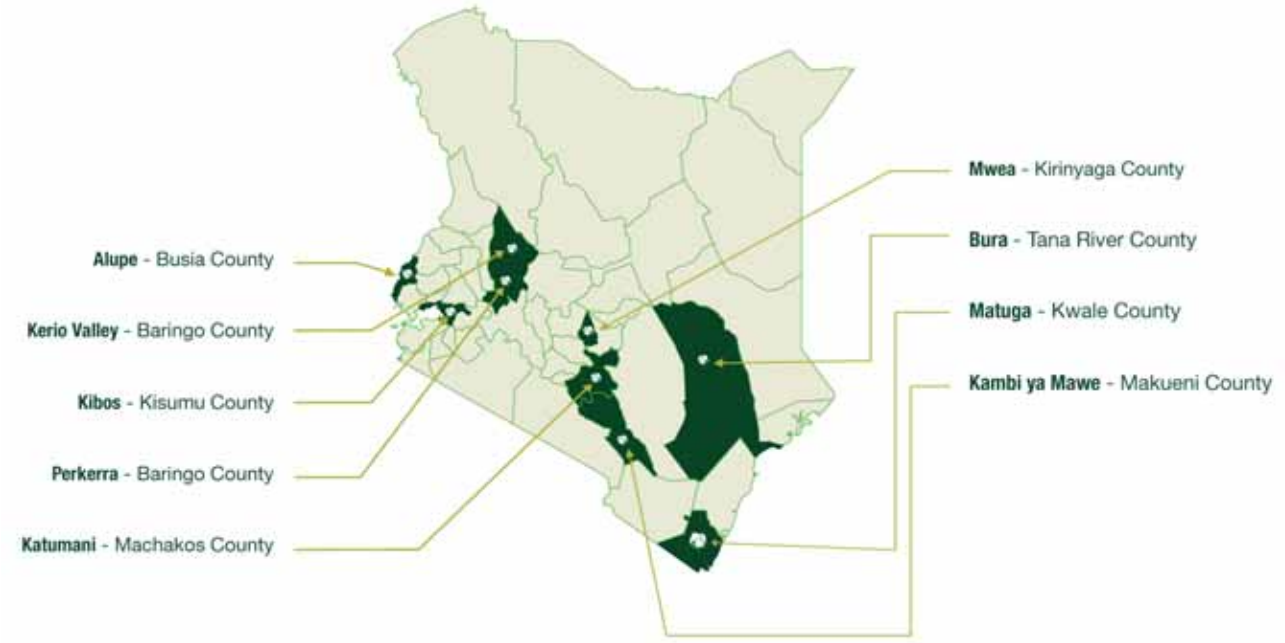
Milestones in Agricultural Biotechnology and Biosafety Development in Kenya




UNEP-GEF Biosafety project begins.
1997
National Commission for Science and Technology (NCST) publishes biosafety guidelines, launches National Biosafety Committee (NBC).
1998
KARI-CIMMYT launches the Insect Resistant Maize for Africa (IRMA) project.
1999
Kenya signs the Cartagena Protocol on Biosafety.
2000
Kenya ratifies Cartagena Protocol on Biosafety; Seeds and Plant varieties Act of 1972 amended to accommodate biotechnology.
2002
Biosafety Protocol enters into force; First drafts of Biosafety Bill and Biotechnology Policy are prepared.
2003
KARI Biotech Center launches Biosafety Level II Greenhouse; KARI begins field trials of insect resistant cotton.
2004
Kenyatta University Commissions the 2nd Modern Biosafety Level II Greenhouse.
2005
National Biotechnology Development Policy approved by the Cabinet.
2006
Biosafety Bill 2007 published and goes through first reading in Parliament.
2007
BioAWARE Kenya launched.
2008
Biosafety Act 2009 accented into law by the President.
2009
National Biosafety Authority (NBA) established.
2010
National Biosafety Authority Board formed.
2011


Cabinet approves importation of GM maize.
2011
Three sets of biosafety regulations (contained use; environmental release and; import, export and transit of GMOs) gazetted.
2011
Biosafety labeling regulations gazetted.
2012
NBA inaugurates the Annual National Biosafety Conference.
2012
Cabinet places a ban on GMO food importation.
2012
The Kenya University Biotechnology Consortium (KUBICO) is formed.
2014
Biosafety Appeals Board formed
2014
NBA receives two applications for open field cultivation of GM maize and cotton.
2015
National Biosafety Authority Board re-constituted.
2015
Association of National Biosafety Agencies in Africa (ANBAA) is launched.
2015
NBA gives conditional approval for open cultivation of GM maize and cotton.
2016
NBA receives an application for open field cultivation of GM Gypsophila cut flowers
2016
Bt-cotton Commercialization Taskforce created
2017
Bt cotton NPTs planted
2018

NPT Sites for Bt Cotton



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Karembu M. Top Ten Facts about Agri-biotech and Biosafety in Kenya.
International Service for the Acquisition of Agri-biotech Applications (ISAAA AfriCenter), Nairobi Kenya.